REMARKS

Claims 1-3 and 5-7 are currently pending in the application, with claim 1 being independent. Claim 1 has been amended and claim 4 has been canceled.

The Examiner is respectfully requested to reconsider the rejections in view of the remarks set forth herein. Applicant respectfully requests favorable consideration thereof in light of the comments contained herein, and earnestly seeks timely allowance of the pending claims.

REJECTION OF CLAIMS UNDER 35 U.S.C. § 103

Claims 1-7 have been rejected under 35 U.S.C. § 103(a) as being made obvious by JP Patent Publication 2002-096344 ("Kawakita") in view of JP Patent Publication 2002-096332 ("Kawakita II"). This rejection is respectfully traversed.

Applicant has amended claim 1 to incorporate features similar to features that were recited in claim 4, and claim 4 has been canceled. Amended claim 1 recites:

> "A method of designing a molding die for molding an optical device having a desirable form optimized so as to yield a desirable wavefront aberration by using a plurality of optical parameters;
>
> the method comprising the steps of:
>
> designing by using at least the plurality of optical parameters, a temporary optical device for optimizing a form so as to exhibit the desirable wavefront aberration;
>
> making, according to the optimized form of the optical device, a temporary molding die for molding the optical device;
>
> molding a first temporary optical device by using the temporary molding die;
>
> measuring a wavefront of thus molded first temporary optical device and calculating a plurality of wavefront aberration amounts Δi for a plurality of divided wavefront areas of said measured wavefront of said molded first temporary optical device, where $i \geq 2$;
>
> calculating correction wavefront aberration amounts $-\Delta i$ compensating for each of the wavefront aberration amounts Δi;
>
> designing a second temporary optical device for optimizing a form so as to exhibit a wavefront aberration with the correction wavefront aberration amounts $-\Delta i$ without using a table prepared beforehand which shows a relationship between a deviation of the wavefront aberration amount and a deviation of the optical parameter; and
>
> designing, according to the optimized form of the second temporary optical device, a normal molding die for molding a normal optical device."

To establish a *prima facie* case of obviousness, the Examiner has the burden of meeting the basic criterion that the prior art must teach or suggest all of the claim limitations. Regarding this basic criterion, Applicant submits that Kawakita, Kawakita II and any combination of these references (assuming these references can be combined, which Applicant does not admit) do not disclose or suggest all the features recited in claim 1, as explained in detail below.

In the Office Action (page 4), the Examiner rejected claim 4 based on paragraph [0024] in Kawakita. However, this paragraph of Kawakita does not discuss any plurality of divided wavefront areas. Paragraph [0024] merely discloses the following:

> "Step 3 (S3)
> The optical property is measured and evaluated about the fabricated object lens 1. An interference fringe and the 3rd spherical aberration value are acquired by transmitted-wave-front measurement, and the existence of gap with a desired optical property is judged to be evaluation of an optical property, for example. When gap is between the optical properties which he follows to Step 4 (S4) and for which it asks when there is no gap between the optical properties for which it asks as a result of evaluation, it progresses to Step 5 (S5)."

Kawakita is concerned with the entire interference fringe (as seen in Fig. 3 and described in paragraph [0025]) and does not perform any analysis for a plurality of divided wavefront areas of a measured wavefront. Thus, Kawakita does not disclose or suggest:

> "measuring a wavefront of thus molded first temporary optical device and calculating a plurality of wavefront aberration amounts Δi for a plurality of divided wavefront areas of said measured wavefront of said molded first temporary optical device, where $i \geq 2$ [...]
> designing a second temporary optical device for optimizing a form so as to exhibit a wavefront aberration with the correction wavefront aberration amounts $-\Delta i$ without using a table prepared beforehand which shows a relationship between a deviation of the wavefront aberration amount and a deviation of the optical parameter." See claim 1.

Kawakita II is similarly concerned with an entire interference pattern and does not calculate a plurality of wavefront aberration amounts for a plurality of divided wavefront areas of one measured wavefront. Kawakita II also does not design a second temporary optical device for optimizing a form so as to exhibit a wavefront aberration with a plurality of correction wavefront aberration amounts $-\Delta i$.

Kawakita and Kawakita II also do not envision calculating correction wavefront

aberration amounts $-\Delta i$ compensating for each of the wavefront aberration amounts Δi of a single wavefront. See claim 1.

Applicant maintains that Kawakita and Kawakita II also do not disclose or suggest designing a second temporary optical device for optimizing a form so as to exhibit a wavefront aberration with the correction wavefront aberration amounts without using a table prepared beforehand which shows a relationship between a deviation of the wavefront aberration amount and a deviation of the optical parameter. The fact that Kawakita and Kawakita II do not disclose the claimed feature whereby a table prepared beforehand is not used, has been continuously disregarded by the Examiner. As the MPEP directs, all claim limitations must be considered in view of the cited prior art in order to establish a *prima facie* case of obviousness. See MPEP 2143.03. Furthermore, MPEP 2141 directs the Examiner to consider all rebuttal evidence presented by the Applicants when reevaluating any obviousness determination.

The Examiner alleged that Kawakita II discloses the claimed feature whereby a table prepared beforehand is not used. Specifically, the Examiner alleged that Kawakita II "uses an optical simulation and evaluation to calculate the correction wavefront aberration amount not a table prepared beforehand" (page 3 of Office Action). Applicant respectfully disagrees. Kawakita II does not disclose designing an optical device for optimizing a form so as to exhibit a wavefront aberration with the correction wavefront aberration amounts without using a table prepared beforehand which shows a relationship between a deviation of the wavefront aberration amount and a deviation of the optical parameter.

The Kawakita II reference performs optical evaluation of the lens, shape measurement of the molding die and surface shape measurement of the lens, in order to perform its aberration analysis. On the other hand, the invention of claim 1 uses, for correction, an input of wavefront aberration.

As explained in the Reply filed on November 20, 2009, Kawakita II does not design an optical device for optimizing a form, so as to exhibit certain wavefront aberration, without using a table prepared beforehand which shows a relationship between a deviation of the wavefront aberration amount and a deviation of an optical parameter. Kawakita II performs optical simulations to obtain lens surface parameters for a lens equation (paragraph [0029]) using a lens surface shape shown in drawings 5 and 7. Specifically, Kawakita II inputs a lens surface shape,

such as the lens surface shape illustrated drawing 5 or 7, and outputs a table (drawing 6 or 9) which illustrates aberration as related to aspherical surface constants.

Claim 1 recites calculating correction wavefront aberration amounts compensating for wavefront aberration amounts, and designing an optical device for optimizing a form so as to exhibit a wavefront aberration with the correction wavefront aberration amounts. Therefore, in the method recited in claim 1, wavefront aberration amounts are input (are used as an input) and correction wavefront aberration amounts are then calculated to be used in the designing step. The simulation method of Kawakita II is different from the method of claim 1 because Kawakita II does not use wavefront aberration amounts as an input. The lens surface shape (illustrated drawing 5 or 7 of Kawakita II) which is the input to the optical simulation in Kawakita II is not a "wavefront aberration amount(s)" or a "correction wavefront aberration amount(s)". Furthermore, the aberration amounts listed in drawing 6 or 9 of Kawakita II are not input parameters for the optical simulation either. The aberration amounts listed in drawing 6 or 9 are the results (output data) of the optical simulation.

Contrary to Examiner's assertion, the optical simulation of Kawakita II uses a table prepared beforehand, since Kawakita II obtains optical parameters for a lens using a difference between optical parameters for a virtual lens 1 and a mass production virtual lens 1, by calculating a difference between tables of aberration values for optical parameters of virtual lens 1 and mass production virtual lens 1 (drawing 9, paragraph [0033]). Thus, Kawakita II does not disclose the feature of claim 1 whereby a temporary optical device is designed without using a table prepared beforehand.

In addition, Kawakita II does not discuss any concrete correction measures, and only describes calculating an aberration amount which is not used as a correction measure. Specifically, Kawakita II compares the tables for virtual lens 1 and mass production virtual lens 1 for calculating an aberration value, but this aberration value is not used as a correction measure.

Kawakita II shows the judgment measures for judging whether the mass production-type molding die is good or not (suitability of molding die) by measuring and evaluating the mass production-type molding die, without making an objective actual lens. However, Kawakita II does not describe details of any correction measures. Kawakita II only describes that

designing/making the tentative mass production-type molding die is repeated until an optical evaluation of a tentative mass production-type imaginary lens falls within tolerance limits of an optical evaluation (as explained in the Japanese paragraph [0011] of the Japanese publication of Kawakita II), and that when the tentative mass production-type molding die 2 is designed/made, it is good to design/make it by taking an optical evaluation of the tentative mass production-type imaginary lens and an optical evaluation of the reference imaginary lens 1 into consideration (Japanese paragraph [0037]). Kawakita II does not, however, provide any detail about a concrete measure to correct wavefront aberration so as to reduce the wavefront aberration amount.

In addition, in the Kawakita reference only the aberrations which are applied to the table calculated and prepared beforehand can be corrected. Further, the correction using the table is according to the assumption that the deviations of parameters and aberrations change linearly (constantly). However, since the actual deviations do not change linearly, the approach of Kawakita cannot be used to determine the correction amount in accordance with a table for such actual deviations. In addition, when correcting a plurality of kinds of aberrations using a table, the measured aberrations need to be analyzed first, then they need to be divided into individual kinds of aberrations (such as, for example, three-degree spherical aberration, five-degree spherical aberration, etc.) calculated using the table, and then, finally, a correction amount is calculated using the table. However, when the correction of a plurality of kinds of aberration parameters is needed while an interaction between a plurality of aberrations exists, it is impossible to use the table of parameters prepared beforehand, because the table does not include interactions between different kinds of aberrations. Therefore, a new correction (which is different from an addition of correction amounts corresponding to tabled individual aberrations) is needed in this case. This type of new correction is not in the table prepared beforehand and cannot be implemented by the references.

The method of claim 1 calculates a plurality of wavefront aberration amounts Δi including all the kinds of aberrations for a plurality of divided wavefront areas, and then designs a temporary optical device considering the correction wavefront aberration amounts $-\Delta i$ corresponding to the measured wavefront aberration amounts Δi. This method is different from those of the Kawakita and Kawakita II references. The claimed method can achieve an effective

correction of aberration taking into consideration an interaction between a plurality of aberrations without using a table prepared by predicting various aberrations, or by analyzing a kind of wavefront aberrations, or by performing measurements of lens surface shape and/or shape of molding die. These advantages of the method of claim 1 cannot be achieved by the cited references.

For at least the reasons presented above, Kawakita and Kawakita II fail to teach or suggest all of the elements for claim 1.

In view of the above, claims 1-3 and 5-7 are patentable over Kawakita and Kawakita II. The allowance of claims 1-3 and 5-7 is respectfully solicited.

CONCLUSION

In view of the above, Applicant believes the pending application is in condition for allowance.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Corina E. Tanasa, Registration No. 64,042, at telephone number (703) 208-4003, located in the Washington, DC area, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§ 1.16 or 1.14; particularly, extension of time fees.

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Respectfully submitted,

By _____

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